Background Reading for Kordia™ Board Strategy Day

Volume 2

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Mangonui

kordia

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Kordia – the Challenge of Transitioning from its Broadcast Heritage

The Heritage

The combination of many years as a broadcast transmission and O&M near monopoly in NZ and the long term BA contract for broadcast infrastructure maintenance in Australia meant that more than 90% of Kordia's revenue and of EBIT in 2004 came from the broadcast industry.

In 2004 services for other industries, telco, maritime and others contributed the remaining revenues and EBIT. These non-broadcast activities were peripheral to the broadcast business and even today in NZ are modest in scale and contribution. There are still no significant Kordia Network customers outside the broadcast and tier 2 telco sectors despite a range of initiatives and settlement with TelstraClear in 2000 to enable Kordia to grow in telco.

During the last three years deployment of DTT continued the engagement in broadcasting and single industry dependence in NZ, although the shift to a digital only industry was signalling the future revenue and EBIT decline. The loss of the BA contract in 2007 meant the closure of Kordia Pty and completion of the DTT project in 2008 impacted heavily on KCC which has struggled to find broadcast projects offshore.

Today, broadcasting is still the dominant activity in Kordia NZ, the DNA of Kordia Networks. Future growth however is in broadband and associated infrastructure and services.

Industry change

Since the late 90's and more rapidly in the last few years the internet, digital technology, related innovation and VC funding of start-ups is transforming communications and other industries. The growth in the use of the internet for communication, information sharing, business, social networking, leisure and entertainment has been explosive and is expected to continue and accelerate in some areas. Video downloads for example are already affecting broadcasters' traditional activities, as newspapers were impacted earlier.

The structure of industries in the TMT space and elsewhere has changed and the relatively orderly and understandable past with known competitors has disappeared. Fragmented supply chains, new and previously unknown competitors and disruptive change and innovation are now the norm.

Kordia acted on the need to change with the acquisition of AAPCS in 2005 and the FY06 Three Year Strategic Plan recognised the need to broaden focus from the broadcast sector to the massive TMT sector.

The acquisition of Orcon in 2007 signalled a further step in execution of the strategy.

The effective closure of Kordia Pty (broadcast) business has meant that Australian business activity is almost entirely in the telco sector.

Revenue Growth in Kordia is Dominated by Telco Sector

In the last four years (pre AAPCS) revenue has changed as follows:

	FY05	FY09
Broadcast	$112m	$120m
Telco	$18m	$175m

The Kordia Australia telco business is growing fast ($74m FY06, $113m FY09) and Orcon is growing at more than 40% per year.

With the exception of the temporary revenue boost from the introduction of digital TV in NZ, broadcast revenues will remain flat and then decline sharply at analogue switch-off in 2014. In the current financial year however, 70% of Kordia NZ's profit will be derived from broadcast customers.

In FY11, and beyond, recent investments in Kordia Networks are expected to generate strong revenue and profit outside of the broadcast segment. When coupled with growth in Orcon, Kordia NZ will transition through analogue switch-off financially strong with its broadcast heritage reducing to a lesser but important part of the overall revenue mix. The shift to a modern TMT business will have occurred.

Being successful in industries other than broadcasting

Kordia's past success has been based on a near monopoly position in broadcasting in NZ and many of its relationships, practices and behaviours reflect this. The scale of broadcasting has also mostly meant non-broadcasting activities in NZ although earnestly pursued have been and remain "poor cousins".

Both Kordia in Australia and Orcon are securing well defined positions in their non-broadcast industries and markets, and could be seen as "Newcos" – able to focus independently and outside of the broadcast industry. Kordia Networks and Contracting & Consulting are "Corecos" (still entrenched in the core broadcast business). Broadcasting is in their DNA and this inhibits engagement in other industries, services and markets.

Future focus

The likely shape and scale of the broadcast business in the future is now reasonably clear with some challenges to broadcasters, particularly in the traditional broadcast activities.

So, successful future growth with scale has to be in other services, industries and markets. This requires:

1. Maintaining a strong broadcast business, with less dominance in Kordia NZ.
2. Enabling significant growth by KN and KCC outside of broadcasting without the dominance or influence of Kordia's broadcast heritage and DNA inhibiting new foci and activities.
3. Accelerating growth in Orcon and Kordia Solutions in Australia.
4. Other significant activities e.g. PIPE.

Challenges

Orcon and the Australian operations of KCC are on strong and well focused growth paths.

The challenge is for Kordia Networks and the NZ operations of KCC to fully break out from the broadcast box and reposition for real growth in the telco segment. The new Sales & Marketing arrangements are key to achieving this for Kordia Networks.

KCC with a clear mandate, a constructive relationship with KN and strong alignment across the Tasman has the potential to reshape and reposition itself quite rapidly.

For KN and KCC (NZ), these changes require a shift from dominant, known and familiar activities. Organising and operating so these non broadcast initiatives and activities have the same "Newco" clarity of focus and success as KS and Orcon are challenges for now and the FY10 year.

Geoff Hunt
Chief Executive – Kordia®
20 January 2009

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Telco2.0™ Manifesto

Who are we?

STL is an advisory and analysis firm specialising in supporting innovation and change in the Telecoms, Media and Technology (TMT) sectors.

The telecom industry was structurally stable from the early days of the telegraph and telephone systems through to the arrival of mobile telephony, despite rapid technology change and varying fortunes of individual players. We now see a need for change in the industry to reflect a new world increasingly unlike that experienced before.

This Manifesto, which reflects our thinking on TMT industry change, is written by STL. STL has developed a number of unique Telco 2.0™ services that support successful innovation. We also run a Telco 2.0™ blog which further reflects our thinking.

Comments and feedback are welcome, and should be posted on the blog or sent to contact@stlpartners.com.

Why "Telco 2.0™"?

- Telecom (including mobile) is one of the worst-performing sectors in most stock markets in recent years.
- The vertically integrated business model is under attack from all sides: tougher regulation, new technology (most notably VoIP and open spectrum), arbitrage, new entrants, and advancing customer expectations.
- P/E ratios suggest little investor belief in this improving. They have low confidence in "converged" or triple/quadruple-play bundles providing high returns.

Our belief is that there is a single dominant source of structural change in the communications industry. This trend is the **separation of network connectivity from user-facing application services and content**. The phenomenon is both technical ("everything over IP") as well as financial (separate purchase of access and service).

The trend is clear and obvious. Changes to mass user behaviour are already seen (eg. VOIP, P2P music/video downloads, Social Media). Yet few (if any) operators have strategies that can be explicitly traced back to this underlying force.

If most of your revenues come from an endangered voice product, it's time for a fundamental re-think: in the recent STL survey of 180 telco professionals, 60% said "Strategic re-think" is the top priority for telcos and 92% said it is a key priority.

Conclusion: Telcos need to review their business model in each of the markets they are serving: their position in value chain, what the products are, who the customers are and how they buy and pay for the products.

What is "Telco 2.0™"?

Telco 2.0™ is a new way of thinking about the Telco industry. It consists of STL's collection of unique products and services: Telco 2.0™ Industry Brainstorms, Telco 2.0™ reports, a Telco 2.0™ blog, Telco 2.0™ In-house Workshops and Advisory Services (with proprietary Telco 2.0™ methodologies).

"Telco 2.0™" defines any business model where connectivity is supported by a *sustainable* economic model. This means the end of artificial cross-subsidies between services and connectivity. We assume an all-IP world where choice of applications, devices and platforms is entirely driven by user preference. Connectivity charges will increasingly reflect actual costs of delivery (unlike, say, mobile roaming charges); relatively trivial services like standard voice call routing are effectively free; and thus the scope for the latter subsidising the former ceases to exist Customers will only take your replacement offering because they want it, not because they have no choice.

A change in thinking

The hardest, but most important, part of reaching Telco 2.0™ is a change in the culture and mindset of operators:

- An assumption of abundance, rather than rationed scarcity.
  Example: Share a hundred images in a picture-sharing service rather than sell one MMS.
- A preference for openness, rather than hoarding of assets and information.
  Example: How much brand value is lost locking down Bluetooth from reaching its full potential to users?
- A change for most from a network-centric view in favour of focusing on customer data, billing, relationship, distribution and partnership assets.
  Example: What is the real value of the call detail records in creating intelligent call routing services?
- A desire to connect people above the promotion and consumption of media content or information services.
  Example: Why invest so heavily in streaming video from media conglomerates when user preference and revenue consistently comes from the sharing of user content and experiences?
- A willingness to learn from, and interact with, the broader world of Internet players.
  Example: What are the lessons of Skype for telcos wishing to broaden the reach of their voice and messaging products to new platforms?
- Agility and innovation in core messaging and voice products, in contrast to today's stasis.
  Example: Vonage's troubles partly stem from having merely replicated POTS, rather than having innovated.
- Getting away from the fear of "dumb pipes". Utility businesses can be very profitable given the right cost base, and funding/pricing approach.

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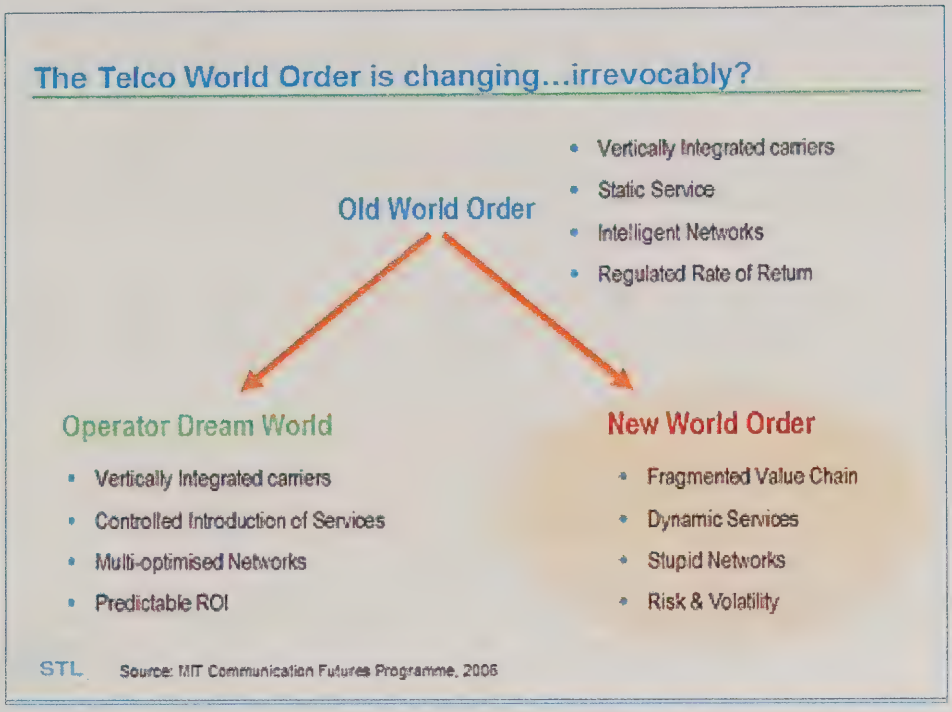


Practical steps to define your strategy

To achieve the Telco 2.0™ goal, we believe that operators need to engage in the following activities:

- **Aggressively optimise existing products and business**. In particular, mobile handsets are not being fully exploited as a sales and promotion channel for existing products. Sales, support and operational costs are too high. These need to be engineered out through process and product redesign.
- **Honestly re-examine strengths and weaknesses versus Telco 2.0™.** This feeds into a "strategic map" of the positioning of yourself, other operators, and non-traditional competitors.
- **Clearerly focus on the right part of the value chain.** We believe that trying to be "all things to all men" in any market is a recipe for disaster: the separating layers of the business model will tear your business apart.

Every operator needs to understand which part of the value chain it has most affinity towards in each of the markets it serves:

1. Trusted Relationship Brand for the "Digital Lifestyle"?
2. Personal Communications Service Provider and Integrator?
3. Enabling Platform Providers for 3rd party services?
4. Connectivity Providers with maximum reach?

Whilst the above activities are clearly not mutually exclusive, we believe simultaneous pursuit of leadership in multiple "layers" of the value stack is unlikely to bring success.

Furthermore, operators need to consider **diversification strategies** outside of their current core business model of sinking network capital and then recouping the investment by tolling the traffic over that network.

From strategy to tactics

1.) Trusted Relationship Brand for the 'Digital Lifestyle': Need to divest themselves of unnecessary capital assets; enhance their affinity partnership and distribution capabilities; diversify into other offerings aimed at the same market or demographic; rapidly exploit ideas from emerging

technologies and leading markets (such as Korea); and exhibit greater dynamism in product development.

2.) Personal Communications Service Providers and Integrators: Get a much better understanding of where value comes from in voice, messaging, community and presence. How will these worlds intersect with the strong growth of online game playing, social networking and self-expression?

3.) Enabling Platform Providers for 3rd Party Services: There are already precedents in coarse-grained platforms (e.g. MVNEs like Sprint) and more tightly controlled and integrated platforms (e.g. i-mode). Greater interoperability with the giants of the IT and Web worlds is needed, as well as an ability to attract smaller players.

4.) Connectivity Providers: often fall under the derogative "dumb pipe" mantra, but can be enormously attractive and profitable when suitably differentiated. We believe considerable unexplored opportunity exists in this space. For instance, new funding methods like municipal networks should be seen as much as an opportunity as a threat.

In all cases, there are many "leaks" in the abstraction of Internet Protocol that the operator can exploit: network topology, geography, location, identity, relationships between edge nodes, distribution, billing, and so on. Every one of these gaps between theory and reality is a business opportunity.

Welcome to Telco 2.0™

At the conclusion of the journey, you will have:

- Divested yourself of assets and activities not strategically aligned with the "Telco 2.0™" goal.
- Created new financial and operational metrics to measure the progress of your organisation.
- Updated your processes and product pipeline gating criteria to reflect your new priorities.
- Considerably enhanced your product portfolio and innovated in the space which fits your new business model.
- Engaged in the right new supplier and partner relations, potentially enabling other players to progress up or down the value stack.
- Adapted your products to be "IP-compatible" by reinforcing defences (where sustainable) and the creation of new value.

Above all, you will have a more compelling story to tell investors.

There is nothing more difficult for a truly creative painter than to paint a rose, because before he can do so he has first to forget all the roses that were ever painted
– Henri Matisse

BusinessWeek

Bring U.S. Broadband Up to Speed

For long-term economic growth, Obama's stimulus package should include a $10 billion to $15 billion investment in high-speed communications infrastructure

By Sol Trujillo

The Obama Administration's stimulus package to jump-start the American economy should include a crucial and relatively inexpensive program to improve the country's communications infrastructure. This would ignite long-term growth throughout the economy and close a serious technology gap between the U.S. and many other countries.

The U.S. desperately needs to catch up with global leaders in two areas of high-speed broadband communications. The first is extending the current world-class wired broadband service now used by big business, smaller companies, and consumers across America. The second is increasing the transmission speed and reach of wireless service to nearly everywhere in the nation. Achieving these two goals would bridge the digital divide between city and country and provide a powerful productivity tool to all sectors of society: private enterprise, nonprofit organizations and institutions, and every level of government. A federal stimulus plan should do more than just add jobs in the telecommunications industry.

U.S. Missing Out on Productivity Gains

In many countries, including Australia, broadband service is available to a much larger percentage of the population than in the U.S. Many have much faster and more versatile third-generation, or 3G, wireless broadband networks—what much of the rest of the world calls the "mobile Internet." On the wired side, many countries have a lead in the penetration of robust fixed-line networks that their businesses are using to innovate and create new opportunities. The greater power and penetration of their networks means their businesses can reach more customers. Result: Companies in other countries are leveraging broadband and the Internet to operate more efficiently and create game-changing competitive advantages. Their governments are also using high-speed broadband technologies to reach more citizens and lower the cost of services in health care, education, and public safety. America is missing these productivity gains at a time when it needs them most.

Based on what I have seen as CEO of media and telecommunications companies on three continents, I believe the U.S. should use a small portion of its stimulus spending as seed money for the nationwide deployment of high-speed broadband networks, wireless and wired, capable of transmitting data at speeds of 100 megabits per second (Mbps), compared

with speeds of one or two Mbps that are common today. But it's important that the right policy mix be in place to encourage the private sector to invest the additional capital necessary for these networks.

Japan, South Korea, and Europe have been well ahead of the U.S. for a while. China just approved a measure to upgrade to 3G wireless service at an estimated cost of $41 billion. And Australia, with territory nearly as large as the continental U.S. and a very similar population distribution, has wireless network speeds of 21 Mbps to cell phones, laptops, and other wireless devices on a mobile Internet that reaches 99% of the population. This speed, nearly 10 times faster than the best U.S. wireless networks, enables Australians to transmit real-time video, photos, MRI images, and other data that cannot yet be delivered by American wireless systems. In 2009, we will double Australia's network speeds to 42 Mbps—providing bandwidth fast enough to download a two-hour movie to a laptop on a beach in four minutes. That's faster than all but a tiny fraction of U.S. wireline broadband connections.

Economists who say productivity gains based on digital technologies have peaked have not seen the future as it is playing out in other countries, particularly on the wireless front. In Australia, for example:

• Construction companies download drawings to remote sites and coordinate jobs in real time without sending managers on the road.

• Medical technicians transmit mammograms, MRIs, and glucose screenings from rural stations and mobile vans to central interpretation facilities in minutes, cutting days of transport time and increasing the efficiency of radiologists and the quality of patient care.

• Farmers use wireless telemetry to manage remote irrigation systems and avoid driving hundreds of miles daily, saving thousands of dollars of fuel, water, and time over the course of a growing season, while simultaneously reducing carbon emissions.

In the U.S., improving health care by cutting duplication and waste and enhancing quality of care will require better management of patient data and more robust networks. In addition, manufacturing and retailing need the data-mining capabilities that high-speed broadband enables. Furthermore, research and development is directly dependent on analyzing and moving immense quantities of data. The networks the U.S. now has are just too slow and not pervasive enough.

Aside from missing out on innovation, the U.S. also is missing opportunities to better manage its infrastructure: bridges, roads, tunnels, elevators and other facilities. With ubiquitous, reliable data networks, video surveillance can monitor facilities 24/7, microtelesensors the size of an aspirin can be used to gauge heat, stress conditions, or aberrations that signal infrastructure is at risk. Minnesota might have avoided any loss of life if monitors had been used on the interstate highway bridge that collapsed into the Mississippi River.

Provide Incentives for Industry Investment

I believe that if the government primes the pump and provides the right regulatory environment, the telecommunications industry will invest the $20 billion to $30 billion needed to build complementary wireless and wired broadband networks that reach at least 90% of the American population. This would include expanding the number of wireless towers, upgrading their capacity, expanding fiber networks, and upgrading cable TV boxes from analog to digital to expand bandwidth on existing cable systems. I urge the government to put up $10 billion to $15 billion in a combination of low-interest loans, tax advantages including accelerated depreciation, and other incentives for companies to invest in the telecommunications "plumbing" that will deliver end-to-end high-speed service to many more Americans. One step should be consumer subsidies to help people upgrade their cable TV boxes. If the investment climate is right, industry will employ private capital to create the powerful and pervasive communications infrastructure our country needs. Government assistance can help finance extending the service to sparsely populated and low-income areas where it is not economically viable.

But building telecommunications networks is different than building highways because newer, less-understood technologies are involved. In such cases, history has shown that corporations are better suited to make the crucial technological decisions and risk capital than more risk-averse government agencies. A high-speed Internet cannot be mandated or regulated into existence. The key is to give the private sector incentives to invest. But policies and regulations must be predictable and technology-neutral. No one, least of all the government, has perfect vision as to what technologies will yield the right combinations of capability and affordability.

Some of the right policies are decidedly old-fashioned—the private sector would need investment tax credits and the right to accelerate depreciation, for example.

Getting the right policy mix also would require shattering the myth of net neutrality. It may seem like a high-minded ideal to argue that everyone should have unfettered access to telecom networks at a discounted rate. But one low price for unlimited use destroys telecommunications companies' incentive to invest the tens of billions of dollars needed to create and maintain networks. For them to earn an appropriate rate of return on their investments, they must be allowed to charge rates based on usage. People who consume massive amounts of bandwidth, by distributing movies online, for example, would pay more than small users. Net neutrality works directly against the goal of unleashing private capital and know-how to build a nationwide, high-speed mobile Internet. Regulatory clarity must be in place before the private sector will risk capital.

It should not take much time to sort out all these issues. The place to begin is by recognizing a simple reality: America is seriously behind other countries in some of the future's most important infrastructure capabilities. But if America clears the obstacles to bold investments in telecommunications, it will provide a foundation for innovation and competitiveness and help its battered economy to rebound.

Trujillo is chief executive of Telstra, the largest Australian media and telecommunications provider.

Economic Effects of International Internet Bandwidth Competition in New Zealand

19 December 2008

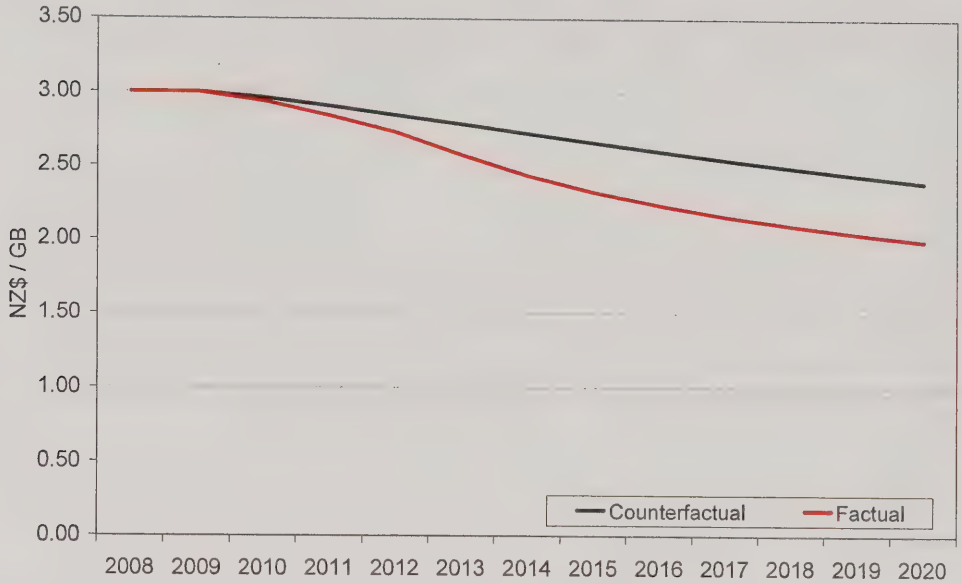
At Kordia's request, Covec has modelled the economic effects of an increase in infrastructure-based competition in the provision of international Internet bandwidth between New Zealand and other countries. Specifically, we consider the effects in the wholesale bandwidth market and the consequences for the retail broadband market of a proposed investment by Kordia in a new trans-Tasman fibre-optic cable between Auckland and Sydney that is planned to be operational in 2011.

Currently, the Southern Cross Cable is virtually the only option for fibre-optic connectivity out of New Zealand, and competition in the market for supply of international bandwidth is very limited. Kordia's proposed investment will greatly increase competition in the wholesale bandwidth market, as it will be a direct substitute for Southern Cross on the trans-Tasman route, and a good substitute on other routes via alternative networks accessible from Sydney.

We model how wholesale bandwidth prices are likely to evolve over time with and without Kordia's investment. We then translate these wholesale prices into average retail broadband prices per gigabyte (GB) of data that broadband subscribers face. Our analysis covers the period from 2009 to 2020. Figure 1 shows our forecasts of average retail prices of broadband data usage if Kordia does not invest (the counterfactual) and if Kordia does (the factual).

We assess the economic benefits of these price reductions by calibrating a model of retail demand for broadband data and calculating the economic value of the increased usage that is generated by the price reduction under the factual. We calculate the total economic benefits net of Kordia's investment cost, as well as the net benefits to consumers. These figures are calculated in present value terms, over the period from 2009 to 2020.

Figure 1 Forecasts of average retail broadband prices.



In developing our baseline scenario we have made assumptions about the following factors:

- Growth in broadband penetration and population growth
- Growth in data usage per broadband subscriber
- Changes in wholesale bandwidth prices charged by infrastructure providers
- The relative intensity of competition on trans-Tasman and other international routes
- Current broadband usage and prices faced by retail broadband subscribers

Under our baseline scenario, described in detail in our report, we find that the competition induced by Kordia's investment will generate net total economic benefits over the period from 2009 to 2020 of $469 million. Net benefits to consumers, which count transfers of revenues through lower prices from suppliers to consumers as a benefit, are $1,006 million over the same period.

Our main conclusion is that, under our expected parameter values, there are significant economic benefits to New Zealand from additional competition in international bandwidth. Overall, in our view, infrastructure based competition in international bandwidth such as that generated by Kordia's proposed investment is a very positive

step, and will lead to improved competitive outcomes in wholesale and retail broadband markets.

It is important to note that our analysis is confined to the retail broadband market, as we are able to obtain relatively good information about consumer behaviour in this market. In reality, the effects of competition will be more widespread, and will provide benefits to other bandwidth users such as large businesses and content creators who are not consumers in the retail broadband market.

We also consider the sensitivity of our results to the basic assumptions. We find that the basic conclusions do not change for reasonable variations of the key parameters for which there is most uncertainty. Considering +/- 5% variations of all key parameters simultaneously gives the range of results shown in Table 1.

Table 1 Estimated economic benefits of international bandwidth competition under different scenarios. (NPV, NZ$m).

Measure	Low	Baseline	High
Net consumer benefits	438	1,006	2,356
Net total economic benefits	101	469	1,464

For further information, please contact Aaron Schiff (aaron@covec.co.nz, phone 09 916 2012).

THE TREASURY
Kaitohutohu Kaupapa Rawa

Global Economic and Financial Crisis: Origins, Responses and Ongoing Challenges for New Zealand

John Whitehead, Secretary to the Treasury

Russell McVeagh, Auckland
Monday 15 December 2008

Introduction

In the well-known ancient Chinese curse one wishes one's adversary to live in interesting times. For economic advisers and policymakers, times rarely get much more interesting than at present.

We are currently in the midst of the worst international financial crisis for many decades and of a rapid deterioration in the global economic outlook. These pressures, and the challenges they pose to households, businesses and governments, have intensified greatly in the last three months.

Firstly and briefly I want to put the current global economic and financial stresses, and the way they are affecting New Zealand, into some sort of context. Then I want to outline some of the factors that will influence the way things will play out over the coming year and beyond.

Treasury will be releasing its latest official forecasts later this week and so I won't be getting into details today. Suffice to say, while downturns don't last forever, the economic and financial stresses globally have become so severe in recent months, and show little sign yet of receding, that we face a tough few years. Quite how tough and despite the assertions of some, no one knows with very much confidence. More than usually, in times like these, the informed judgement of experienced professionals is more useful in shaping a view than the latest individual pieces of economic data. We – governments, firms, and households – all need to be making decisions very mindful of the wide range of plausible economic outcomes here and abroad.

Background

One can't make sense of the current situation without recognising how we got here. Private sector credit in much of the world has boomed in the last decade or so, rising to unprecedented levels (relative to GDP) across a wide range of countries. This was made possible by relatively low interest rates, new waves of financial innovation, and more relaxed - in some cases quite complacent - attitudes to risk. And once the process got underway it tended to be self-reinforcing, with rising asset prices and buoyant moods supporting additional borrowing and additional spending.

New Zealand has long been at the forefront of this appetite for credit. Our household debt, mostly financed by short-term bank borrowing abroad, is among the highest in the world, and the appetite for new credit to bid up farm prices has been almost as marked.

In much of the West, interest rates this decade were lower than they'd been before partly because of the impact of policy choices, around exchange rate regimes, made in some of the more important emerging economies. These countries succeeded in building rapidly growing export industries, and then - in aggregate - they saved rather than spent the proceeds. To support demand and economic activity, and indeed to finance purchasing the exports the emerging countries were selling, interest rates in the advanced economies were kept lower than normal for prolonged periods.

Each country, and each individual borrower, made choices in their own interests, but together those choices led to a build-up of serious global imbalances. Those imbalances had been recognised as a growing risk for a number of years. Unusually large current account surpluses, and extraordinary accumulations of foreign reserves, offset unusually large current account deficits in many countries, including our own.

The emerging world's export boom and easy access to cheap credit in the West helped fuel several years of strong global growth. Consumer price inflation was kept broadly in check. But the easy credit conditions and strong growth helped fuel an unsustainable, and quite unprecedented, global boom in asset prices. Commodity prices soared, and residential and commercial property prices in much of the Western world doubled in the last 5-10 years. When asset prices like these change that quickly it is usually a sign of looming troubles. Rapidly rising debt and asset prices left the world economy and financial system very vulnerable if anything - however initially small - disrupted the process.

It is striking just how far the leverage boom and resulting asset price inflation spread. Much commentary is very US-centric, and pays a lot of attention to, for example, securitisation of subprime mortgages in the United States – and to possible associated regulatory failures. Securitisation was much less important in most other countries – hardly at all in

New Zealand. But in many of those other countries, developed and emerging, the imbalances that have built up have been at least as large as those in the United States. No doubt there have been weaknesses, and even failures, in regulatory structures in various countries, but at its heart this economic and financial crisis isn't about the failure of regulation. Instead, it's about accumulated excesses: excess borrowing in many countries, and excess investment in others. It has all been on a larger scale than we've seen before, but manias, bubbles, and resulting imbalances themselves are as old as market economies.

The excesses would have unwound - albeit less painfully - even if no bank or financial institution had failed. Asset prices had got well beyond long-term replacement cost and the ability of household incomes to support them. Business investment in some important emerging economies also went well beyond sustainable levels, supported by the export boom. None of that, of course, means that anyone foresaw quite how sudden and dramatic some of the adjustments would be.

The financial crisis has greatly intensified in the last couple of months. Stock market falls get the headlines in the popular press – and on a worldwide basis stock market falls have been on a scale almost without precedent. But the most immediate and pressing financial sector issue has been the breakdown in credit markets. Combined with extreme volatility, the much-reduced access to finance is greatly exacerbating the global downturn. Again that should surprise no one, given the role that easy access to credit has played in supporting growth in business and consumer spending - and putting cash in government coffers - in the last decade.

Responses to the crisis

Governments and central banks around the world have moved quite quickly to adopt measures aimed to restore confidence in the financial sector and mitigate the extent of the economic slowdown.

Some of the steps that have been taken would have been inconceivable only a year ago – as just one example, the willingness of our own government to offer wide-ranging guarantees potentially covering almost all the liabilities of our banking system. The retail guarantee was designed to ensure ongoing public confidence in the soundness of the financial system. The wholesale guarantee scheme - in many ways much more important - is about helping restore the disrupted access to the vital flow of foreign credit into New Zealand.

Interest rates have been cut very dramatically in many countries. Our own Reserve Bank has cut interest rates by 325 basis points since July – including a 150 point cut just 10 days ago. In some countries, those whose normal interest rates are much lower than those in New Zealand, official interest rates are now so low that questions are now being raised as to what to do next if/when interest rates reach zero.

A business audience will be well aware official interest rates are one thing but at times like the present actual borrowing costs can be quite another. The OCR is an important indicator rate but banks actually fund themselves from markets, not from the Reserve Bank, and the overall cost of raising funds from the market has not fallen markedly to date. Indeed, it has been very difficult for the system as a whole to even roll over maturing term funding. Even with the benefit of government guarantees, international banks are finding the cost of raising term wholesale funding very high. Partly as a result, business borrowing costs facing New Zealand firms have not fallen greatly so far this year. But in other countries - including the US and UK – the rise in market interest rates has meant that in some cases the overall

cost of new borrowing has actually risen, even as the respective central banks have slashed policy rates. In New Zealand, as Alan Bollard has pointed out, lending rates need to fall in line with the cost to the banks of raising funds.

An increasing number of governments are also using fiscal policy to mitigate the slowdown. New Zealand's actual and scheduled tax cuts, including those to be enacted shortly by the new government, mean that the fiscal stimulus being put in place here is among the largest adopted by any developed country. We are in the fortunate position of having run budget surpluses for a number of years, which meant we entered the crisis with one of the lowest levels of public debt of any OECD country.

New Zealand's exchange rate is volatile, but the floating exchange rate has at least stood us in good stead in recent months, providing an important buffer. The exchange rate has fallen sharply - probably more so than one might have expected simply based on the difference between our interest rates and those in other countries. When economic activity in other countries is also weak, it is hard for exporters to develop new markets quickly, but the fall in the exchange rate is providing a very helpful offset for those export producers directly affected by rapid falls in commodity prices.

Economic developments

The global crisis has come in several waves since it began in July/August last year - the most recent episode in September/October was the most intense. Further periods of extreme pressure in some or all parts of the global system remain a significant risk. Very substantial real losses of wealth have occurred, and further losses are likely, especially now that corporate sector pressures are becoming more apparent. Imbalances that have built up over many years are rarely unwound either easily or painlessly – all the more so when those imbalances are not centred in a single country, but are affecting in one form or another almost every country.

New Zealand is just one among many of the developed and emerging countries that have accumulated large external imbalances in recent years. New Zealand has always been heavily dependent on foreign capital, and many of our more severe past recessions have resulted from constraints on access to finance. But even here, in recent years current account imbalances once considered almost inconceivable became for a time almost ordinary.

So far, markets haven't "picked on" New Zealand in particular. Our exchange rate has fallen a long way, but so have those of Australia and the UK. The assets of the New Zealand and Australian financial systems are still widely regarded as among the soundest in the developed world. The four Australian banks, each with major subsidiaries in New Zealand, are among a small number of financial institutions still rated AA.

Turning back to the global picture, it is impossible to determine quite how far the process has to run. There is no precedent for such a large and widespread leverage boom - and, hence, little basis for knowing how far the unwinding process may need to go. However, IMF analysis suggests that the effects of serious financial crises - which typically have their origins in economic imbalances - typically last for several years. Forecasters, here and abroad, are rapidly lowering their growth forecasts for the coming year, including those for developing countries. The idea that economies such as China's might, in some sense, "decouple" from the developed world's slowdown now has little credence. And as economies weaken in many countries, new credit losses, and new stresses on financial institutions are likely to become apparent.

As just one example, it is hard to imagine that corporate Australia can have gone through such a huge commodities and investment boom without serious corporate losses beginning to emerge at some point. Reports suggest that it is really only in the last couple of months that the severity of the slowdown has begun to impinge on corporate Australia. And in New Zealand, the volume of credit extended to support the dairy land boom has been highlighted as a risk by the Reserve Bank. The conversations Treasury has with businesses to inform our forecasts showed a marked change in tone across sectors between August and late October.

It is a difficult balancing act for firms. On the one hand, there is the pressure for retrenchment and caution, and near-term self-preservation. But to be kept in tension, on the other hand, is the risk of missing out on future opportunities if competitors move ahead and regain confidence or market access more quickly. Many investment projects have long lead times and choices made today will have implications, for individual firms and for national economies, for years to come.

Individuals face similar uncertainty. While most households will be happy to see lower mortgage rates and petrol prices right now, these reflect weak markets and conditions. Job losses will happen in a slowing economy. Many mortgaged householders will be finding that, even if their mortgage interest rate is actually finally beginning to drop, the value of their house is a lot less relative to the size of their mortgage debt than they would have liked. Negative equity is becoming more widespread - unsurprisingly when credit indicators suggest that house prices here are falling in excess of 10 per cent per annum.

And banks, even well-managed ones with sound asset books are likely to remain more cautious. Access to wholesale market funding for Australian and New Zealand banks remains a significant constraint. As the wholesale guarantee scheme is deployed, we expect that banks will be able to obtain some term funding. But that funding is likely to be expensive, and remain scarce: globally there is a huge backlog of debt that needs to be refinanced next year, and Australasian borrowers are unlikely to be at the front of the queue. To the extent that the foreign credit can't be rolled over at reasonable prices, domestic access to credit could be even more constrained than it is at present. More generally, it is hard to envisage much growth in bank balance sheets in the next few years. Banks value long-term relationships with good customers, but their business models depend on access to capital and secure medium-term funding.

Looking beyond the next six to 12 months, attitudes to risk, and to extending and taking on credit, are likely to have been changed markedly, and enduringly, by the experience of this crisis. Firms, households and financial institutions will all behave differently as we emerge from this than they did before. Neither investment nor consumption spending seem likely to be anything like as robust in the years ahead as they have been in the last half decade.

That could mean that potential economic growth rates are materially impaired for several years to come. That will make it a difficult time for everyone, and re-emphasises the importance of lifting productivity growth. Treasury published a series of papers in the past 12 months around the constraints to productivity, and have been discussing these views with our contacts in business and academia. This has influenced the way in which we have talked with the new government.

New Zealand's policy response

For us in the Treasury the prospect of weaker growth also poses significant challenges in advising the government on how to conduct fiscal and macroeconomic policy. Going forward, the economy is going to be smaller than appeared likely even a few months ago, which means there will be less revenue available to meet the commitments and aspirations of governments and citizens. Similarly, existing spending plans were set when there was a far stronger growth outlook. In fact there will be pressure on spending from increased expenditure on benefits. Taken together, the government's debt position will deteriorate in the next few years. This deterioration will also reflect lower nominal growth and increased finance costs from deficits and rising debt. As a consequence, while we are likely to see low rather than negative economic growth over the next two years, we will see significant fiscal deficits that will be projected to go on for some years. This will result in an increase in public debt, the extent of which may be a surprise to those who have got used to the run of surpluses in recent years.

The government will rightly want to do what it can to support economic activity through the difficult year ahead - and our relatively high interest rates and low starting level of government debt provide a little more leeway than many other countries have. While we will need to monitor closely the economy's reaction over the next year to policy easing, our judgement at this stage is that easing fiscal policy further than planned by the government is not warranted. Monetary policy easing will provide further stimulus, and there is still some scope left for further easing if necessary. As a number of commentators have noted recently, we also need to be mindful that further fiscal stimulus will lead to larger operating deficits, which would increase funding pressure in an environment where it is likely to be difficult to raise funds. We also recognise that the fiscal pressures associated with an aging population are drawing ever closer every year and will need, at some point, to begin to adjust to the worsening debt position and re-establish the prudent levels of debt that help act a shock-absorber. In this environment getting value for the money that the government does spend – which is always desirable – now assumes particular importance.

Sustained recovery will eventually get underway as the imbalances are worked through and policy measures help reinforce tentative recoveries in confidence. When that happens, it will be equally important that central banks and governments around the world move in a timely fashion to ensure on-going price stability and long-term fiscal sustainability. That will be particularly important for New Zealand – as an erstwhile motorcyclist I know that when your skull has been saved by your crash helmet, the first thing you should do is replace your helmet

The aftermath of this crisis is likely to see a major global reassessment of the way in which governments and financial markets interact. That may pose particular challenges for regimes such as those in New Zealand that put considerable emphasis on the role of market and self-regulatory discipline. As the Prime Minister noted in his recent address at APEC, there may also be a need to stand back and look again at the question of whether monetary, fiscal and prudential policy can play more active roles in countering cyclical excesses, especially when they involve a sharp rise in asset prices.

Internationally, preserving an open international trading system is critical for New Zealand and for other countries. Growing world trade, and deepening New Zealand's international connections, are vital foundations for improving our living standards. Putting up protective barriers was one of the huge policy mistakes of the 1930s. We must not let that happen again. The crisis heightens the need for an effective rules-based multilateral trading system, and strengthens the case for redoubled efforts to conclude the WTO Doha Round.

Domestically, the rapid growth in credit in recent years has masked some of the longer-term challenges facing the New Zealand economy. New Zealand's productivity and investment performance has been poor, and while improved labour force participation helped arrest the decline, our incomes still languish well behind those of our developed country peers. One strength in our favour is that we have a track record of being able to make good decisions in difficult circumstances and have strong monetary and fiscal institutions. But more is needed. Treasury recently offered some thoughts on how governments might best respond to these challenges over time:

- Improved access to markets and connections between NZ firms and the rest of the world
- Incremental changes over time to address weaknesses in our tax system that harm growth
- Building institutions and systems that improve the quality of regulation, and maintaining a stable environment for investment
- Shifts towards more effective investment across the education sector to get sustained increases in skill levels
- Developing mechanisms, like water pricing, to manage increasing natural resource pressures and
- More effective and efficient public spending by aligning spending with government priorities; and strengthening the assessment of the quality of services and spending.

Some of these suggestions have been welcomed and some not. But if we are serious as a country about the incomes we aspire to - and the social and environmental objectives we desire – then it is vital that we debate these ideas and others that are put forward maturely and sensibly. While the government will not always agree with Treasury's advice or ideas it has made it clear that it wants us to put ideas forward and encourage such debate.

Conclusion

The scale of the shocks the world has faced in recent months means that the economic outlook over the next few quarters, here and abroad, remains very uncertain. Sustained recovery will get underway as the imbalances are worked through and policy measures help reinforce tentative recoveries in confidence. Our judgement is being exercised around when, and in the short term there is the risk of further shocks.

However, while there are undoubtedly tough economic times ahead, we believe that there is scope for the right policy choices to lift New Zealand's economic performance. I'm one of those who are incredibly positive about New Zealand's prospects. Our low government debt levels provide us the flexibility to take actions that other countries would find far more difficult. And the impact of changes in asset and credit prices should help with structural imbalances in the economy over time. Managing the immediate challenges, without losing sight of the longer-term imperatives , will make possible the sort of prosperous society we all aspire to - and requires creative and courageous responses from us all - firms, households, public servants, and governments. Let's embrace that opportunity.

Hybrid TV

Taking Advantage of the Best of IPTV and SatTV

August '08

Until recently, telecom operators have put their faith in IPTV to protect margins and to allow them to occupy all channels to the customer's home – voice, broadband and TV. As a result, DSL operators across Europe have been rolling out CAPEX-intensive networks to provide customers with IPTV and to strengthen their position in the face of growing competition from cable companies. But new approaches are now emerging...

IPTV services have a significant drawback: the coverage achieved is usually considerably lower than for DSL because more bandwidth is required. This is set to become even more significant as HDTV, which requires more than 10MBit/s, becomes the standard. As demand for HDTV services takes off, operators will have to find new ways to increase the coverage of their TV services in order to achieve their original goals.

Many telecom operators are now considering complementing their IPTV rollout with DTH (Direct-to-Home) services. However, Arthur D. Little believes that while DTH as a stand-alone platform is an efficient way to provide 3-Play services, telecom operators should think about offering hybrid TV services as a means to providing their customers with additional IP and Web TV services.

1. How it all began...

Telecom operators originally had two major reasons for entering the TV/content business:

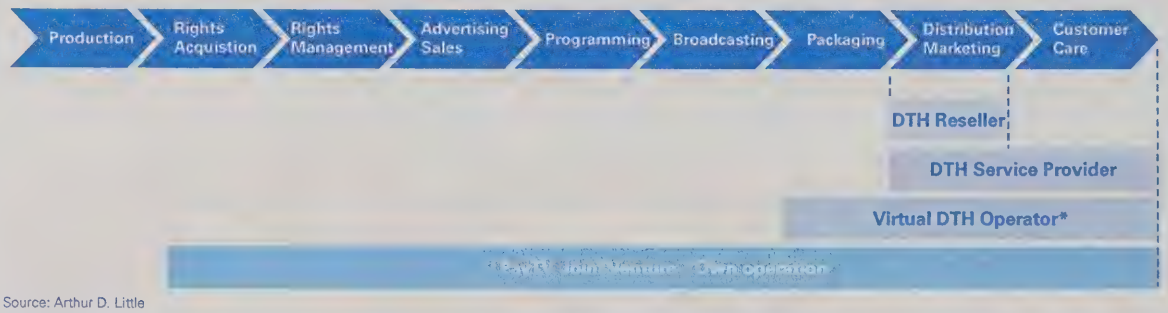
- To stabilise core revenues and margins by reducing churn and increasing ARPU through bundling IPTV offers with broadband access and PSTN services.
- To secure content and advertising revenues.

With IPTV services beginning to take off, operators are now considering increasing the coverage of their service offering. While investing in IPTV infrastructure is becoming increasingly uneconomical in the less densely populated areas that are not yet covered, telecom operators could achieve the desired results by considering a different technology. DTH (TV broadcasting via satellite) is already used successfully in many European countries. Adding DTH would free up capacity on DSL, enabling operators to deliver many high quality channels (on DTH) and interactive value added services (VAS) such as VOD (Video on Demand) with DSL.

2. DTH as a first step

Many operators are already in the process of complementing their IPTV offer with satellite TV in areas where sufficient bandwidth is not available. Satellite TV allows for cost-efficient coverage, freeing up cash for the acquisition of content rights. This strategy also has the advantage of being quick to roll out. Building the necessary infrastructure can take less than six months (depending on the broadcasting infrastructure in place and the option chosen for implementation). Once the infrastructure is in place the only additional investment is for the required CPE (Customer Premises Equipment). With a fixed initial investment, the cost per subscriber decreases significantly as penetration increases. Since many operators offering IPTV services already operate a broadcasting head-end, additional investment in the broadcasting infrastructure is manageable.

Figure 1: Options for setting up a DTH TV business



Source: Arthur D. Little

Depending on market conditions, there is a range of options for rolling out DTH services, from pure reselling to fully integrated own operations:

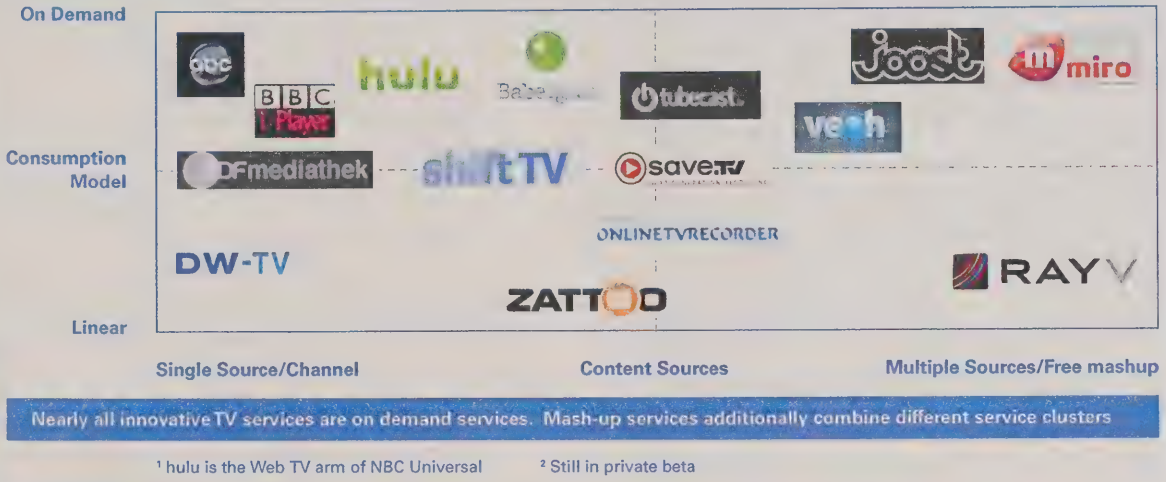
- **DTH reseller:** sells TV packages of other PayTV providers through its own distribution channels. The DTH offer is branded like the original offer from the DTH operator or co-branded. Value for the customer is based on additional services. The DTH reseller does not broadcast or package, but has wholesale agreements with DTH operators.
- **DTH service provider:** sells TV packages of other DTH operators through its own distribution channels. The DTH reseller can label the packages. Customer care is the responsibility of the DTH service provider. Value for the customer is based on additional services. The DTH service provider does not broadcast or package, but has wholesale agreements with DTH operators.
- **Virtual DTH operator:** distributes packages of channels and pay-per-view content assembled from content providers /broadcasters. The virtual DTH operator differentiates itself by being able to offer a mix of different Paid TV offerings. Further potential for differentiation is based on own labelling and the offering of additional services. The virtual DTH operator does not broadcast, but requires agreements with DTH operators to get access to their packages.
- **Own operation:** the telecom operator sets up an own satellite broadcasting operation either alone or with a partner. All relevant business processes are fully controlled and managed by the operator. The major prerequisite for setting up such an operation is the operator's ability to secure content and to provide customers with set-top boxes. It is also essential to build/acquire the necessary infrastructure, mainly the head-end needed for broadcasting content to the relevant satellites.

Operators should evaluate the options carefully depending on time-to-market and the extent to which they wish to control content. Of course, the necessary investment will vary significantly for each option. However, even starting an own operation is likely to require much lower investment per subscriber than IPTV, even for relatively small subscriber numbers.

Overall, we estimate a total initial investment (for the head-end and CRM system) in the range of a high single digit to a low two digit million (Euro) figure. In addition, CPE (in this case the set-top box) will cost between EUR 80 to EUR 200 per unit, depending on the features. The major part of the OPEX will be running the head-end and renting transponder capacity, which will require approximately one million EUR per year, together with the programme (content) cost; this makes DTH a very cost-efficient, and increasingly affordable, broadcasting platform for providing TV and 3-Play to customers.

"Overall, we estimate a total initial investment (for the head-end and CRM system) in the range of a high single digit to a low two digit million (Euro) figure."

Figure 3: Examples of online TV and Video services



[1] hulu is the Web TV arm of NBC Universal [2] Still in private beta

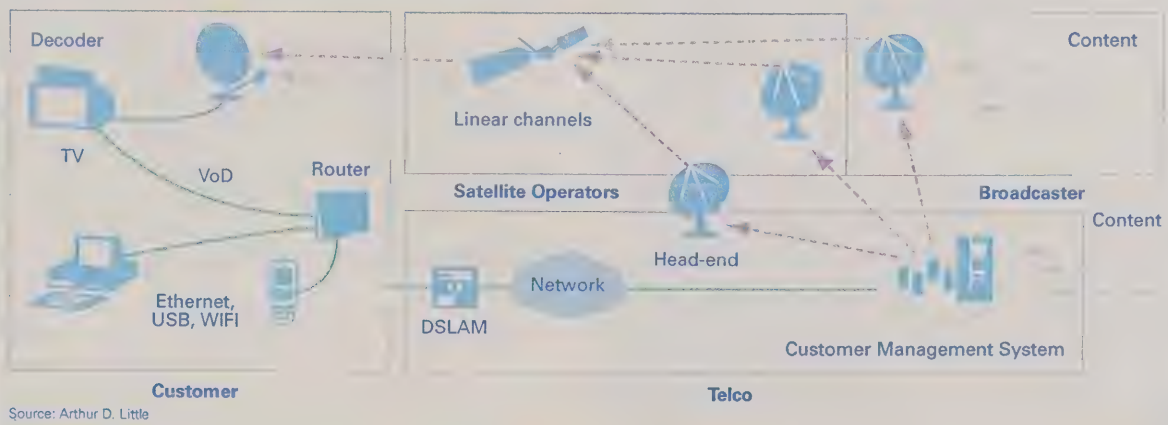
Source: Arthur D. Little

4. Ways out of the trap – hybrid TV services?

While DTH offers a cost-efficient opportunity for telecom operators to complement their existing IPTV infrastructure, they need to avoid being outflanked by developments in WebTV and On-demand services. By combining their fixed-line infrastructure with satellite services, they may be able to stay one step ahead of the competition with superior coverage and services, while at the same time being able to complement existing IPTV services.

Hybrid TV services combine the best of both worlds, with linear TV channels in HD quality and value-added services such as On-demand or timeshift TV being supplied in the most cost efficient way. HD linear TV, which requires 8Mbit/s bandwidth, would be provided through the cost efficient broadband satellite platform. Additional interactive services, typically requiring lower bandwidth, would remain on DSL. The key requirement to offer such services is a hybrid set-top box. These boxes feature a decoder for satellite TV as well as an IP interface for connection to the Internet.

Figure 4: Hybrid TV – Combining the best of two worlds



Source: Arthur D. Little

DTH TV as an opportunity for mobile-only operators, cable players, and PayTV operators

The options for providing DTH TV services represent an opportunity not just for fixed-line operators, but for mobile-only players, cable operators and pay TV operators too.

Mobile-only players: Given that DTH services need hardly any fixed infrastructure, mobile-only players providing voice and mobile data services could quickly set up and sell triple-play services. In fact, with the increasing market pressure for bundling and multi-play offers, mobile-only players' lack of fixed infrastructure could even become an advantage, since they would have lower overall costs (although a certain market size is required to realise economies of scale when providing DTH services). The value proposition for end-users can be dramatically enriched when buying triple-play services from the mobile operator, namely: mobile voice, mobile broadband and PayTV services. In developing markets, the demand for this value proposition can be as high as 25% of the population, representing a substantial market opportunity for mobile operators and a chance to defend a "mobile only" customer base.

Cable operators: Cable operators could increase their market coverage by complementing their service portfolio with DTH TV. To do this, they need first to address two points:

- If the pure DTH TV market is not attractive enough, how could voice and data services enhance the TV offer? (Partnering with mobile operators could be an option.)
- Given the different cost structures of cable TV and DTH and the need to ensure that the core business is not cannibalised, what is the appropriate marketing/pricing strategy? (This is especially true for the areas where cable infrastructure already exists.)

PayTV operators: PayTV operators could benefit from offering DTH services directly to their customers. First, by partnering with mobile operators, PayTV operators could extend their footprint and use the mobile operator's marketing and sales power to increase their market share and subscriber base by reaching an agreement for the use of the mobile operator's sales channel and joint marketing efforts.

Second, partnering with a mobile operator might also help PayTV operators in gaining important bargaining power needed for the acquisition of exclusive content rights and also open up new viewing channels (mobile, online) for their services.

5. Conclusion

Competitive pressure from the cable companies means telecom operators need to move into the TV/content business now and position themselves in the emerging content market. To benefit from the revenues generated through IP based interactive TV services, telecom operators should try to move up the value chain as quickly as possible. We believe the window of opportunity in this market will not be open for more than two years. In some markets it will be even less. At the moment, there is still a promising opportunity to gain a good position in the value chain. The prerequisites for success are:

- Implement a **quick roll-out** of TV services with **nationwide coverage** of the population, in order to be able to build a brand in the content market.
- Provide customers with an **affordable access** to linear TV by offering bundled services.
- **Gain critical mass for premium content acquisition and move up the value chain**, away from pure (re-)distribution of content, towards the aggregation /mash-up of content.

In addition, to profit from the development of future TV, telecom operators must provide added value to customers. We see potential for added value in three areas:

- **Quicker/easier access:** Customers of telecom operators could benefit from additional access to services that they have subscribed to through their linear TV subscription.
- **Multi-screen availability:** Telecom operators could grant their customers access to certain content on three screens: TV, PC and mobile. Customers would be able to consume their favourite content on a variety of access platforms, no matter where they were.
- **Identification/billing:** As telecom operators have an existing relationship with the customer, they already have an effective identification/billing process. This is particularly important for content out-of-home or abroad. The reason is that the restrictive awarding of access to content rights tends to be according to territory. A simple identification through the IP address is not going to be enough and may restrict customers' access to their favourite content when they are abroad.

Finally, operators need to understand that a TV/content strategy based on a "walled garden" approach, as tried by mobile operators with mobile Internet access, will not work for a fixed-line operator. However, telecom operators do need to build a unique content brand. Initially it will be important to secure attractive (possibly exclusive) content and offer customers access to this content from whichever screen they prefer. Operators will also need to focus on value-added services built around content that they do not control directly.

If telecom operators do integrate these critical components into their content strategy, we believe there is a good chance that they will be able to participate successfully in the content business. It is paramount for telecom operators to move quickly, as the competition from both cable operators and web players is increasing. Relying on IPTV alone will not be enough for telecom operators to avoid being reduced to pure access providers.

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The team would also like to thank Christian Schimmel for his contribution to this INSIGHT.

Our Experience

Arthur D. Little uses innovation in products, services, technologies, process and business models to help you achieve growth in the Technology, Information, Media and Electronics (TIME) sectors. Arthur D. Little has deep industry knowledge of the telecoms and media sector, based on extensive client work, addressing market analysis, strategy & performance improvement for operators and content providers. We have recently supported several leading global telecom operators on redefining their customer propositions and technology strategies for IPTV and Hybrid TV services. We are actively involved in the broadcast media sector, particularly in premium content rights acquisition and rights valuation.

About Arthur D. Little

Arthur D. Little, founded in 1886, is a global leader in management consultancy; linking strategy, innovation and technology with deep industry knowledge. We offer our clients sustainable solutions to their most complex business problems. Arthur D. Little has a collaborative client engagement style, exceptional people and a firm-wide commitment to quality and integrity. The firm has over 30 offices worldwide. With its partner Altran Technologies Arthur D. Little has access to a network of over 16,000 professionals. Arthur D. Little is proud to serve many of the Fortune 100 companies globally, in addition to many other leading firms and public sector organizations.
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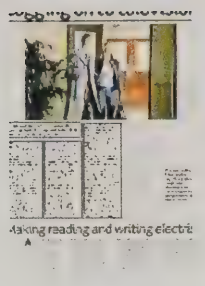

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Logging on to television

The internet has proven it can handle television, but is TV prepared to handle the internet? Matt Hartley reports.

For years, technology companies have tried in vain to bring the internet onto the screen at the centre of living rooms. Although TV shows have made the migration to the web, to date, it has been a one-way road.

Now a new breed of internet-connected televisions is threatening to shake up both the technology and broadcasting industries, while making millions of recently purchased high-definition TVs yesterday's news.

Although the migration of the internet to television could prove a boon for online video services, chip makers and television manufacturers, the new reality, if successful, could also bring about tough new challenges for cable companies and purveyors of set-top boxes.

Earlier this month LG Electronics unveiled a new line of high-definition TVs at the Consumer Electronics Show in Las Vegas that will include software from Netflix Inc – the largest United States mail-order movie service – to allow users to download movies and television programmes directly to their TVs over an internet connection.

Sony Corp and Hewlett-Packard have been selling internet-enabled televisions for a few years now, but users have been reluctant to adopt the technology simply because there wasn't much worth watching.

"They weren't offering much to go with that connection," says James McQuivey, principal analyst at technology research firm Forrester Research Group.

"Whereas now, LG can walk in and say they will give you internet connectivity so that they can give you Netflix, and it finally starts to make sense to people."

Also this month Yahoo announced a deal with Samsung Electronics that will see a new line of the South Korean electronics company's televisions come prepackaged with the internet trailblazer's Widget Engine software, which will allow users to access various services such as the Flickr photo-management application and Yahoo Finance through a launch bar running across the bottom of the screen, similar to a news ticker.

McQuivey says internet-connected TVs will have truly arrived when we see a major web video services like Hulu.com start taking viewers away from cable companies.

Hulu – a joint project of NBC Universal and News Corp – is ad-supported and offers free on-demand videos, allowing users to watch popular US programmes at their convenience.

If broadcaster-backed services such as Hulu become the standard content delivery method for internet-connected televisions, cable and satellite providers, as well as set-top box companies such as TiVo Inc, could lose subscribers.

"Cable companies have the most to lose and it's their business model which is at greatest risk of redundancy in this transition," says Carmi Levy, an analyst with AR Communications Inc.

"It's similar to what the telephone companies have faced from voice over internet telephony (VoIP), mobile phones and free instant messaging tools."

Analysts say Yahoo's efforts to be a leader in internet on television could open up new advertising

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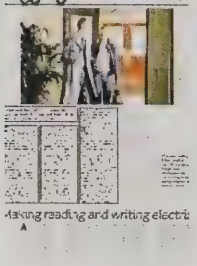

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opportunities for the company in addition to giving it a head start on a growing business before rivals Google and Microsoft Corp make the industry a priority.

Yahoo struck a partnership with chip maker Intel Corp in August to provide the underlying software architecture for internet-enabled TVs in a move designed to establish a platform for developers to create new applications that run on these televisions.

Intel's ability to handle the spread of the internet to new platforms such as television has come to dominate the conversations the company is having with electronics companies, says Bill Leszinske, general manager of the company's digital home group.

Buyers want to know the Intel chips destined for set-top boxes and digital TVs will be able to handle high-definition video streams and downloadable content in addition to internet capabilities, he says.

"The internet has driven the growth of the PC platform for the last 10 or 12 years, it's driving huge growth in the mobile phone space . . . and now we see the usages and the connectivity that users are going to demand are going to create this huge churn and opportunity in the living room." Toronto Globe and Mail

One-way traffic: While the internet has been infiltrated by traditional television programming like Crackle.Com's *Angel of Death*, internet-connectioned televisions have been slow to appear.

The new reality, if successful, could bring about tough new challenges for cable companies and purveyors of set-top boxes.

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Mobile Television in New Zealand

USA and Europe Trip & Summary report

Summary:

Interest in Mobile Television is definitely on the rise Internationally. It is now recognised as being the 7th mass media.

There are over 100 trials, pilots and commercial services around the world from Albania to Vietnam. Technology deployments include: 3G-TV, DVB-H, T-DMB, Media Flo, A-VSB, MPH, DAB-IP, DVB-SH, ISDB-T and even Fixed technologies like DVB-T (In Germany) are used to deliver content to portable/mobile devices. While the 3G-TV technology (TV delivered to individual mobiles over the mobile data channels) is generating the majority of the Mobile Television revenues, it is not providing users with a simple easy to use service, and it is generally accepted that should uptake grow as expected the underlying 3G-TV technology will not commercially scale – ie will not support the number of users predicted. An alternative, 'broadcast' or one-to-many technology is therefore required to meet mass-market television and entertainment delivery expectations.

Business models range in complexity and number similar to that of the technology options. Spectrum and technology aspect are closely linked and in both these areas a miss-mash of acronyms, frequency bands and channel/service capabilities exist.

Traditional National cultures and user viewing/listening habits also vary considerably between markets and countries. Successful commercial Mobile Television deployments will only result from detailed/specific market understanding, leading to the right technology choice, within the most appropriate commercial model and partnerships – and will be unique to just that Market.

Successful deployments result from carefully stitching these social, technical and regulatory components together, into a unique overall National Mobile Television service delivery patchwork.

In New Zealand most of the problems or issues that plague the trials and attempted commercial deployments in other Countries either do not exist or don't apply. Information and data gathered suggests there is a real and immediate opportunity to plan and deploy successful commercial Mobile Television services, in New Zealand, within the next few years.

Introduction:

This report has been produced based on findings from visits to Qualcomm in the US, KPN in Holland, and attendance at the Second Mobile Television Conference in Amsterdam, during November 2008.

Following an overview of some of the issues inhibiting Mobile TV deployments in other parts of the World, this report briefly addresses the key issues around the Mobile TV Technologies, User Propositions, and Business Models.

International overview:

Over 100 trials, demonstrations and pilots of Mobile TV systems have are recorded. Significant 'broadcast' Mobile TV service deployments have already been made, and in Finland, the Philippines, and Vietnam the DVB-H deployments appear to be growing successfully. However the largest deployment to date seems to be the Qualcomm Media Flo system across the Unites States. They have already invested USD1.3B securing spectrum and have deployed a completely new broadcast TV system across the country. The most commercially successful to date seems to be the T_DMB deployment in South Korea, however the Italian DVB-H deployment is not too far behind. The most notable

failure to date has been the non-launch of the German licensed Operator – overtaken by a competitive DVB-T service leveraging an existing fixed DTT system.

While the Broadcast technologies fight it out, the Mobile Operators continue to gather revenue from their 'TV over 3G' services. Here in New Zealand right now, Vodafone subscribers can purchase Sky TV services on their mobile.

There are some common themes evident in the trials and deployments. These include:

- *Copyright limitations* – Producers and owners not making content available or lack of appropriate legislation to allow their use
- *Content rights* – Mobile rights can be sold separately and can be spread across competing FTA and/or Pay TV broadcasters
- *Spectrum* – In many parts of the World, and particularly across Europe Administrations cannot make sufficient UHF spectrum available for both Fixed and Mobile DVB services.
- *Regulations* – In Switzerland, the Government has legislated DVB-H in the Metro areas and 3G-TV in their 'Rural' areas.
- *Technologies:* Each delivers services in different spectrum/frequency bands, require different base power levels, provide different coverage capabilities, some must fit around other close services and each can deliver a different numbers of TV channels.
- *Business Models:* The Mobile Network Operators want to own the customers and services and take the Lions share of the revenue; The content rights owners are seeking high returns and want the Lions share of the revenue; the Broadcast Network Operators are key as they are best positioned to actually deliver the services but are marginalised by greedy MNO's and Content owners.

One key theme from the visits/conference was that "Mobile TV is more than just TV on a Mobile Phone"

Technology

There are a range of technologies capable of delivering television programs to a mobile device. These include the 3GTV 'one-to-one' systems used by many Mobile Operators today, to new broadcast based technologies such as DVB-H, Media Flo and T-DMB. While each has different technical characteristics, the all deliver TV pictures to Mobile devices.

It is important to note that Mobile Television is not just about Television on Mobile Phones – other non-phone devices and market/application sectors are considered an essential part of an overall consumer value offering. The end users expectations and requirements are described in the next section.

There are four 'mainstream' delivery technologies:

1. 2G/3G-TV
   Mobile networks already deliver video to mobile handsets via the 'data' channels of mobile networks. A large number of MNO (Mobile Network Operators) already derive revenue from such services. In Switzerland 3GTV is regulated as the technology for delivery outside the main Metro areas (DVB-H regulated in the Metro areas). In Norway about 0.5% of mobile subscribers use the mobile TV streaming service on a regular basis and this has been steady for several years.

   However the UMTS/Edge TV user experience has been poor, both quality and reliability wise. When multiple users off a cell access the services, large quantities of network resources can be consumed meaning the service is difficult to scale to more than a handful of users per site.

   In Italy, multiple low power DVB-H sites have been deployed off the mobile sites to provide a good user experience. ie one-to-many broadcast technologies are more suited to mass market TV delivery. However the cost of such a dense deployment may only be justified in a dense market as exists in Italy.

2. DVB-H (DVB-T)

   DVB-H is a technology developed by Engineers because they could see a possible application. It optimises power consumption in the mobile devices (Compared to DVB-T technology) and is a viable technology option for New Zealand – providing appropriate UHF spectrum can be made available.

   Although DVB-T capable handsets have been marketed in Germany and mobile services delivered, it is the DVB-H (Handheld) technology from the "DVB family" that is specifically designed for use to mobile devices. It significantly reduces the chip-set power consumption (Compared to DVB-T) ensuring longer continuous viewing, and the transmitted data capacity is limited due to the use of advanced error correction and simple modulation techniques.

   Depending on the system characteristics up to 20 video channels can be provided, however in The Netherlands KPN converted an existing DVB-T service to a DVB-H one with minimal changes and can deliver only 12 simultaneous channels (This is due to them using fixed bit rates [No stat muxing] and the power levels used). They deployed some new 'infill' sites as well to ensure reasonable coverage in dense areas.

   For some Operators, they see DVB-H being deployed only in mobile phone handsets. This is not that case with other Operators and many non-European countries.

3. Qualcomm – Media Flo

   Flo technology has been developed with the end-users in mind. While many of the techniques of DVB-H are also used (OFDM modulation etc) the technology development has been driven more by what users want – not what a particular technology can deliver.

   Within a 6MHz UHF RF channel Media Flo USA have 20 television service channels and in New Zealand, where the UHF band has 8MHz wide RF channels, up to 30 television services may be possible with the Flo technology.

   Usability for is high on the currently available devices, and innovative new services, such as FaceBook links and chat sessions, are a key focus. Ensuring the users have 'cool' features will drive user revenue.

   Non-mobile phone devices are seen as a key area of development. Automotive and other TV receive only devices are under development. Additionally, to make non-Flo equipped display devices mobile TV receivers, re-transmitting receivers are now under development. These receive the TV signals and retransmit them to other Bluetooth or WiFi enabled devices. Early prototypes did not have a return path (hence no 'remote' channel change was seen) but this is an essential functionality that will be developed.

4. T-DMB:

   This technology, developed in the 1980's for Digital Radio services, has undergone a refresh and is now being deployed in new markets – including Australia. It uses VHF spectrum and from ASO in New Zealand, there is a real opportunity to deploy it Nationwide. It could eventually replace FM as the Radio broadcast technology.

   The modern variant utilises very efficient audio encoding technology plus it caters for video services. The VHF band has propagation advantages over UFH and therefore can provide better and lower cost coverage than the Flo and DVB-H technologies. It's 'TV channel' capacity per multiplex is less than Flo and DVB-H but there is potential in New Zealand (After ASO) for more multiplexers. It also has the advantage that both TV and Radio services can be delivered.

Spectrum

For all the 'broadcast technologies' suitable spectrum is essential. Only the 3G-TV services, that use existing mobile spectrum allocations, can be deployed without some new spectrum being made available.

Both Flo and DVB-H use the current UHF television broadcast bands. These are mostly allocated within International standards and so have been the focus of many of the mobile TV technologies – particularly as analogue to digital conversion of current services is expected to eventually release some UHF spectrum. Currently there are opportunities for New Zealand Broadcasters to 'convert' their analogue spectrum to digital spectrum, and Sky's considerable holdings position it well for the future – of both fixed and mobile TV services.

There is a high probability that analogue FM radio services will migrate to a DAB or T-DMB technology in New Zealand – eventually. After ASO there will be considerable VHF spectrum available and several multiplexers could potentially be deployed – depending on the Governments position on alternative uses for the spectrum.

There are spectrum planning considerations that must be fully considered for the UHF band in future. Careful consideration of power levels and fixed/mobile adjacency issues (To avoid interference between fixed and mobile broadcast services) is essential. Also, there is growing International pressure for the 'top part' of the UHF band to be allocated to Mobile services ie more spectrum for Mobile Operators. After ASO it will be possible for the current and future digital services to be 'compressed' and parts of the band made available, by Government policy, for other applications – maybe new Mobile services.

Receivers - Handsets

While in Europe the focus is all on TV services to Mobile phones, in most other parts of the world "Mobile Television is not only about television on mobile phones". Successful content is focused around the 'live TV' experience. 'Must see' sports and news events are clear content favourites with users, and they are watching while waiting for transport, and as a second viewing screen in the home. Customers do see value in mobile TV services, so don't give them away or significantly under value the services.

Currently most mobile TV is viewed on a mobile phone device, and to enjoy a good quality service the screen size, resolution, and the processing capability must be high. Right now the 'broadcast' mobile TV services (Flo and DVB-H) can only be received on the 'high end' phone models. It is thought that the low uptake of 3GTV services is partly related to the poor display capabilities of the average to low end phones. For mobile TV penetration to reach reasonable, business sustainable levels, the capabilities of 'average' devices must be improved. Ie the video display/resolution properties need to filter down to the average device. At current device replacement rates, it could take as little as 2 years for half of the world wide handsets to meet this performance level.

Additionally, it is apparent that there are more market opportunities than simply a TV to Mobile phones service. Other devices – without a high level of connectivity – will form part of users expectations in the future. For example, DVD/Mobile TV receivers for the Automotive market, USB receivers for lap tops and PC's, retransmission devices to send TV to another connected (Via WiFi, BlueTooth) display device eg Apple Iphone. Additionally the ability to record broadcast content for later replay is becoming a required feature.

Return path capability also greatly enhances the value of a mobile TV receiver. It can generate more revenue for the Mobile Operators through SMS fees and make TV services more compelling eg connect/message peers via FaceBook.

In some devices background software operates that captures channel viewing patterns, when downloaded to a host it details all the channels and their viewing times for that device. There are some privacy issues here but these are thought to be manageable.

While it is relatively easy for Mobile Operators to continue to push their 3GTV services, these are neither scaleable nor expected to meet users quality requirements – typically a TV service needs 256kBps of capacity. This is significant in a Mobile network. The broadcast technologies seem best placed to meet the market requirements, however Mobile Operators are looking for ways to leverage more out of the spectrum they paid exorbitant prices for. Some MNO's are anxiously awaiting the maturing of LTE technology before contemplating Mobile TV services.

Whatever technology is deployed, it is critical that the technology be fully and completely proven prior to service launch. Early technology failures are difficult to recover from.

User Propositions

Users must be able to see and understand the value – this means they must be presented with simple and easy to use offerings. In many cases users will be using Mobile TV services so they can have a fully integrated TV experience, no matter where they are located when they are mobile. The primary content offering is event based "live" sports, news and weather. Special events, like motor racing and extreme sports contests can also attract strong followings. With 'live TV' no downloading or streaming is needed – its just there!

Content needs to include Free to Air (FTA) channels as well as pay/subscription channels. FTA broadcasters have new opportunities to market the value of their brand to more viewers, and add value to their advertiser customers.

Start-up free trials are a key component as only then will customers have a chance to 'play' with the TV services prior to making a subscription service commitment ie enter into a contract for a phone and/or a TV service with the MNO's. Keep the initial services feature simple, experiment with new value adds and expect 90% to fail – badly. MNO's need to be very clear about the service reach – Rural reach and Urban receiveability. In most cases, initially at least, it will be necessary to point out that Mobile TV may not have the same coverage as the Mobile phone service.

Users of mobile TV services have a much higher interactivity expectation compared to fixed TV services. Using graphics and video stills, users can be encouraged to 'click through' to promotions and purchase offers.

The use of major scheduled sporting events, in a careful planned manner, to promote uptake cannot be overlooked.

It is believed that part of the packaged TV offerings must be free trial periods plus free to air content so when users buy a new handset they have the ability to 'play' with the services, plus the non-Phone devices. Users are also viewing movie trailers for later DVD hire, and some services allow mobile TV users to order movies for viewing on their PC's over broadband.

Adult content remains a big revenue earner for mobile TV platforms, and is seen as an essential genre.

In addition to TV services, if users can access Radio then they have even more reasons to purchase services. "Pay Radio" is an opportunity, especially when non phone receivers are considered.

The key points from Media Flo are:

- Very important that there is some FTA content (although there is none on the Media Flo USA platform right now).
- MFSO (The Media Flo Service Operator) sets the retail price (not the mobile operator).

- Mobile Operator gets a percentage of the user revenue – maybe also pay a base service fee.
- It is best NOT to bundle TV service with a data plan – keep the Mobile TV service separate.
- Consider an exclusive deal with one MNO for a short time, say 12 – 24 months.
- Look for value added applications, including location based services.
  eg while watching TV – 1 to 1 chat, or 1 to many chat
  Links to Facebook and other social and web sites
- It is essential the have a front panel "TV" button for TV service activation.
  Don't hide it in a menu!
- Promote "Try it" specials, eg first 3 months free (excluding premium channels!).
- The handset manufacturers also get a data channel to their own handsets
  For free and promotion purposes only, cannot use for commercial services
- Find ways to incentives the Mobile Operator to promote and sell the Mobile TV service.
  - MediaFlo are actively investigating other distribution channels outside ofthe MNO.
  (Let MNO have the Mobile phones)
  - Automotive entertainment (ie in car receivers)
  - Personal media (ie need a portable non-connected player)
  - USB plug in on PC players
- Bluetooth/WiFi re-transmitters

Business Model

The Business model is the most critical component of a Mobile TV service offering, not the technology!

The Mobile Operators, because of their direct customer relationship, have generally had a pivotal role taking Mobile TV services to the Market. They design and promote them and take all the risks associated with their success or failure. In New Zealand however, like the majority of other Markets, the 3G-TV services are not great, and as a consequence are not achieving very high uptake rates. There is however widespread excitement about the potential of Mobile Television services and their direct and indirect effects on Operator revenues and ARPU's. The Business model, supported by the right technology, is key to unlocking that potential revenue/ARPU gain.

There are three parties potentially required to cooperate in the deployment a Broadcast based Mobile Television service:

Content Provider(s)	(Essential)
Broadcast Network Operator	(Essential)
Mobile Network Operator	(Optional)

A Mobile Network Operator (MNO) is preferable needed if the Mobile Television services are to be most effectively delivered to receivers embedded within a mobile phone device. It is possible to target stand-alone receivers but commercial success is more probable with multiple Mobile Network Operators involved.

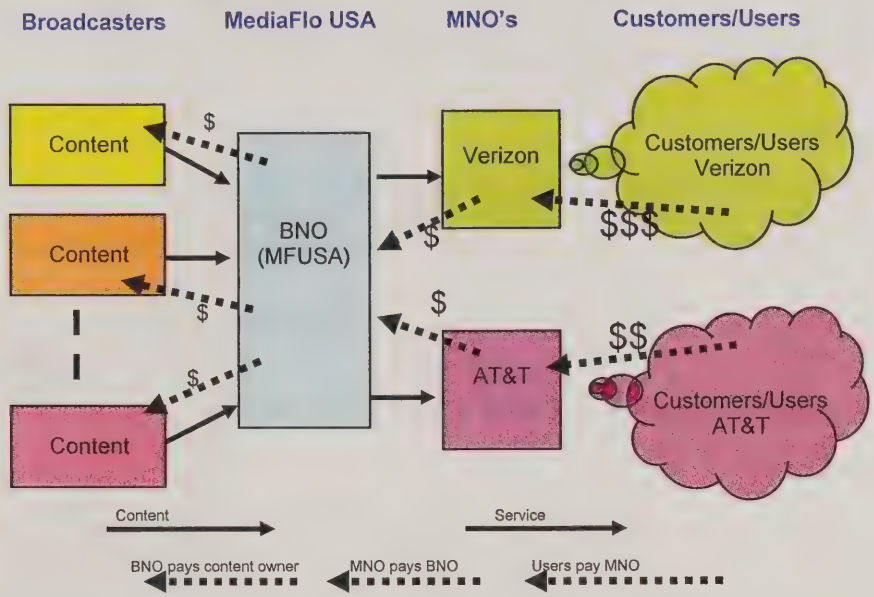
In New Zealand, Sky TV is a natural Content Provider and claim to also have the Mobile TV rights for the majority of their current Pay TV content.

Kordia is the established Broadcast Network Operator and has extensive site and Engineering capabilities.

There are two established Mobile Network Operators in New Zealand, and while Vodafone may appear the more natural choice initially, Telecom New Zealand may make a better launch partner given they have more to gain from enhancing their new GSM850 Network deployment. All MNO's (Including New Zealand Communications) are target customers however an initial (Say 2 year) contract with only one may result in more rapid uptake by more users – if the MNO's was appropriately motivated. Some discussion is required.

Unlike previous models, where the MNO's controlled everything, a more cooperative Broadcast model is becoming more widely accepted as the optimum, to deliver commercially successful services to the Market.

An example cooperative model, as used in the USA by Media Flo, that could be appropriate for New Zealand is shown below.



Outgoing - Content

- Content is sourced by the BNO.
- The BNO manages the content agreements, not the MNO.
- The BNO aggregates, encodes and broadcasts the content to users.
- Content can be common to all MNO's or different/exclusive

Incoming -Revenue

- The users pay the MNO's for the Mobile TV services they consume.
- The MNO's pay the BNO for the service provided – fixed and/or variable
- The BNO pays any agreed content fees to right owners

Using a cooperative model like this means each of the 3 parties is encouraged to manage their 'piece' efficiently and within defined risk boundaries. In many cases the BNO defines the user service offerings plus they set the retail service packaging and pricing. That means the MNO can focus on promoting and selling defined services with known margins. Volume growth translates directly into margin growth. Risks are shared.

This model does not exclude MNO's from developing their own unique content if they wish, and importantly it ensures the BNO is in direct control of the product offering to users. It also allows the BNO to explore other retail channels and new products. As an example, Media Flo USA are currently the Network Operator (Own the Broadcast infrastructure), Content Aggregator, Service Wholesaler (To Verizon and AT&T), and in future have the ability to also become a Service Retailer. In particular they are planning to explore market opportunities including non-phone consumer devices, rebroadcast and device translation devices, as well as the Automotive market potential.

A key learning is that the commercial structure must be defined and agreed first. Exactly what each party puts into, and gets from, the relationship is critical. For example:

Build a matrix of which party is doing or what they are brining to the cooperative.

- Must be detailed

- Include relationships
- Establish exactly what value/role each party brings and will undertake.
- Build a business case over 10 year time horizon.
- Clear business model
- Considers the users/subscribers
- Price and package of the services
- Content costs

In both the US and Europe, there is agreement that users require some free-to-air (FTA) channels. This does provide new audiences to the FTA Broadcasters so could be low-zero cost content. Some FTA simulcast is acceptable however specific FTA Mobile channels are proving successful. On top of these channels, subscription (bundled and/or a la carte) plus pay-per-view channels can be offered. Adult was seen as an essential genre.

Strategy/Actions

Kordia has been exploring Mobile Television technologies for some time and are the logical Broadcast infrastructure and Network Operator for Mobile Television services in New Zealand. Discussions with Sky identified that they have the necessary content rights to the vast majority of 'valuable' content.

Sky and Kordia have agreed to jointly explore the commercial viability of Mobile Television service in New Zealand.

There are a number of actions and activities to progress the opportunity:

Market characterisation:

Primary Market/User research is required to identify the unique New Zealand user characteristics. Verify what genres are essential and nice to have, where users think they might watch the services, how long might they watch and how much interactivity could influence their buying decision. Plus what their cost expectations would be.

It is thought Sky is best placed to undertake this research.

From the results the number of channels and coverage requirements can be defined, then an informed technology choice made.

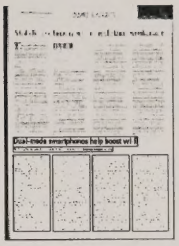
Technical parameters:

While the Market Research is underway, Kordia can undertake preliminary engineering studies into the practicality of using higher or similar powers to DTT services currently deployed. Conclusions reached could speed up the technology decision by excluding some over others. Some indicative costing work could also be undertaken on the 'more likely' UHF technologies.

A presentation has already been made to Sky and they are keen to make progress. Media Flo have indicated a willingness to assist Kordia and Sky in the early business planning stages. Once a Business Model and joint strategy is agreed the Mobile Operators can be engaged. A launch date of mid to late 2010 seems appropriate given the Rugby World Cup is in 2011.

Derek Nielsen, Steve Roberts
8 January 2009

MEDIA MONITORS



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Dual-mode smartphones help boost wi-fi

Wi-fi shipments rose 26% in 2008, driven by new devices. **Stephen Lawson** reports

Wi-fi may not be cutting-edge technology anymore, but iPhones, netbooks and other portable devices will put it in many more consumers' hands this year, according to figures released by the Wi-Fi Alliance and research company In-Stat.

Once associated mainly with laptop PCs, wi-fi is now embedded in many mobile phones, cameras and gaming consoles, and even some TVs. This lets users share data around a home and with friends on the internet, as well as boosting the data speeds of smartphones in certain locations.

Overall shipments of wi-fi chipsets rose 26% to 387 million in 2008, according In-Stat and the Alliance, an industry group. One reason wi-fi is going into so many products is that chipmakers are integrating it with other forms of networking in a single chipset, says In-Stat analyst Norm Bogen.

Rather than beating out other forms of connectivity, such as WiMax or 3G (third-generation) mobile data, wi-fi is being included with them. For example, Qualcomm's Snapdragon chipset for mini-notebooks includes wi-fi alongside 3G, Bluetooth, broadcast TV and GPS capabilities.

Shipments of wi-fi chips in dual-mode mobile handsets grew 52% in 2008, to 56 million units, In-Stat and the Alliance says. The Apple iPhone, which was introduced in 2007 in the US and expanded to more than 70 countries in 2008, helped drive that growth with shipments of more than 10 million units. It also helped set the tone for the industry, making wi-fi capability a standard feature on smartphones, available on Research In Motion BlackBerry models as well as the T-Mobile G1 Android phone. At the recent Consumer Electronics Show in Las Vegas, T-Mobile USA introduced the Shadow smartphone, a dual-mode device that can be used for making calls from wi-fi hotspots.

Wi-fi was also quickly added to stationary consumer electronics devices, such as printers, game consoles, set-top boxes and digital TVs. The number of wi-fi chips shipped in those types of products grew 51% to 48 million units. Consumers also bought more devices that gave them wi-fi connectivity on the run, such as cameras, portable music players and handheld game units, such as the popular Nintendo DS. Shipments in that category grew 33% in 2008, to 71 million units. In 2009, all handheld game devices will have wi-fi In-Stat claims.

Wi-fi's penetration of the laptop market grew more slowly, by just 23%, though from a larger base. There were 144 million wi-fi chips used in portable computers in 2008, counting laptops, mini-notebooks, ultramobile devices and mobile internet devices. The alphabet soup of small laptop alternatives, also including the emerging netbook category, will help drive a 12% increase in the PC arena this year. Almost all netbooks will have wi-fi, while many will also have 3G, Bogen says.

Most PCs are getting the latest wi-fi technology, according to In-Stat and the Alliance. They say more than half of the mobile PCs shipped in 2008 were equipped with 802.11n draft 2.0 equipment. The Alliance began certifying products using this interim standard, which can support speeds of more than 100Mbit/s per second, in June 2007.

Home networking and smartphones will also be significant drivers of wi-fi growth in 2009, according to In-Stat and the Wi-Fi Alliance. Shipments of wi-fi-enabled smartphones should grow twice as fast as for smartphones as a whole, they say.

Multiple network modes are the growing trend, both because many consumers want a choice of connectivity and because the incremental cost of adding wi-fi is minor, according to In-Stat's Bogen. There are some users of laptops and other wi-fi devices who don't mind searching out a hotspot and in some cases paying to use it, but for relatively uninterrupted internet access, cellular data is needed, with wi-fi for a speed boost in certain spots, he says.

Ongoing silicon development is also bringing another big benefit to wi-fi device users, Bogen says: Smaller, more integrated and more efficient chipsets are draining less battery power, and that will only get better over the course of this year, he says.

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